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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/768,092	02/02/2004	Kozo Makiyama	020212A	8674
38834	7590	10/07/2005	EXAMINER	
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP			POMPEY, RON EVERETT	
1250 CONNECTICUT AVENUE, NW			ART UNIT	
SUITE 700			PAPER NUMBER	
WASHINGTON, DC 20036			2812	

DATE MAILED: 10/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/768,092

Applicant(s)

MAKIYAMA ET AL.

Examiner

Ron E. Pompey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) 4 and 7-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-3,5 and 6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 10/084,924.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2-2-04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida (US 5,712,175).

Yoshida discloses the limitations of:

(a) preparing a semiconductor substrate having current input/output regions (2a, 2b, fig. 1);

(b) forming an insulating layer (3, fig. 2) on the semiconductor substrate (col. 4, Ins. 23 - 28);

(c) forming a resist laminate (6 and 3, fig. 7) on the insulating layer;

(d) forming an upper opening through an upper region (6a, fig. 7) of the resist laminate, the upper opening having a laterally broadening middle space;

(e) forming a lower opening (5, fig. 5) through a lower region of the resist laminate, the lower opening communicating the upper opening, having a limited size along a current direction, and having generally vertical sidewalls;

(f) etching the insulating layer (3, fig. 5) exposed in the lower opening;

(g) performing a heat treatment of the resist laminate to deform the side walls (3b, fig. 6) of the lower opening so that at least one of opposite ends of the lower region

at the lower opening is retarded from a corresponding end of the insulating layer and that the lower opening has a forward taper shape upwardly and monotonically increasing a size of the lower opening along the current direction;

(h) filling a gate electrode stem in the lower opening and forming a head (7, fig. 8) in the upper opening, the head having an expanded size along the current direction; wherein the heat treatment in said step (g) makes the opposite side walls of the lower opening along the current direction have a generally symmetric taper shape and be retarded from opposite ends of the insulating layer (col. 3, ln. 39 – col. 4, ln. 22).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida (US 5,712,175) as applied to claims 1 and 3 above, in view of Sasaki et al. (US 6,180,528).

Yoshida reads on the claims as applied above and applying an energy beam to an upper region of said resist laminate for defining an upper opening in element regions, and applying an energy beam to a lower region of said resist laminate in at least part of said element region at a dose depending on the element region, but does not disclose the claimed limitation(s) of:

a plurality of element regions and
wherein the heat treatment in said step (g) is performed at a temperature lower than a glass transition temperature of the lower region of the resist laminate..

However,

a. Sasaki discloses the above claimed limitations regarding:

Performing a heat treatment on the lower resist at a temperature lower than a glass transition temperature in column(s) 5, line(s) 14-20.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Sasaki with Yoshida, because this will cure the sheet and improve precision during etching.

b. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make more than one element since it has been held that mere duplication of essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that more than one element could be formed simultaneously to allow faster production of devices.

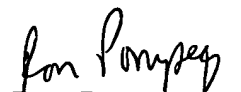
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ron E. Pompey whose telephone number is (571) 272-1680. The examiner can normally be reached on compressed.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Ron Pompey
AU: 2812
October 3, 2005


MICHAEL LEBENTRITT
SUPERVISORY PATENT EXAMINER